Fourth Grade
What Smokey Bear Never Told You

INTRODUCTION

Hi kids! My name is _____, and I work for the _____ National Forest. I am glad to be here with you. Today, I'm going to talk to you about "What Smokey Bear Never Told You."

LESSON

Who has heard of Smokey Bear? That's what I thought – all of you. What are some of the things that Smokey Bear says? Well, there are some things that Smokey hasn't told you. That's what we're going to talk about today.

1. Smokey Bear has been teaching people to be careful with fire in the forest since 1944. By telling people to be careful with fire, Smokey has prevented many forest fires. The U.S. Forest Service and forest rangers from other agencies spread the message about fire prevention. When a fire did break out in the forest, they quickly put it out. Our efforts worked, and we kept a lot of forest fires from burning in our forests. We thought we were doing the right thing, keeping our forests nice and green.

2. But, then scientists learned that fire actually plays an important role in the forest. They looked at cross-sections of trees – what we call tree cookies – and noticed that there were black areas on some of the rings. These were fire scars, left by fires that burned through the forest in the past. These fires were hot enough to leave a fire scar, but not hot enough to kill the tree. By counting the rings and marking where each scar was, they learned how often the tree had been burned. Some trees had burned as often as every 2 to 10 years! Now they realized that in the past, fires were a natural and common occurrence in many types of forests. (As you speak, show the children the tree cookie or pass out tree cookie drawing.)

3. Soon the scientists began to understand what fires do for the forest. Scientists learned that fires can keep the forest healthy.

ACTIVITY

(Have about half of the class – ex**.** 10 out of a class of 21 – stand up. Everyone should stand at least two arm lengths away from one another. These are the mature, healthy trees. Now, from the students who are still seated, pick half of the remaining kids. These are the young, little trees. Have them crouch down next to a mature tree. Now, have one student from those still seated lie down under the mature trees and be a log. Now, have one or two students who are still seated stick on a few bugs – plastic of course – and stand amongst the mature trees. Have one student who is still seated stand up and put on an old man mask – he/she is an old, dying tree. Make sure all the kids but one have a role.)
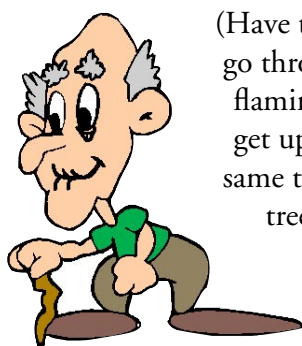
(Have the last kid be the fire. He/she should go through and "zap" the little trees with a flaming staff. Once "zapped," they have to get up and go back to their seats. Do the same to the logs, the insect trees and the old tree. When they have all been "burned up," have the remaining healthy trees stretch, take a big breath, and say, "I feel a lot better now!")

LESSON CONTINUED

What we just did was to imitate what fires of the past did!

A. Fires killed young trees that sprouted underneath older, larger trees. This prevented the little trees from growing up and competing with the larger trees for water and nutrients in the soil.

B. Fires killed trees that were old, sick or infested with insects. That prevented diseases and insects from spreading to healthy trees. By removing the old and sick trees, fires also gave healthy trees more room to grow.

C. Also, fires removed trees that were starting to fill in meadows, so that grasses, flowers and shrubs could grow in the sunshine. Meadows provide food and habitat (homes) for wildlife.

4. Scientists realized that by putting out all the fires, we have changed our forests.

B: facts through 12
C: mental math and estimation with multiples of 10
D: one-digit divisor to find quotient with remainder
PO 2: Calculate multiplication and division problems using contextual situations
1M-E5: Represent and use numbers in equivalent forms (integers, fractions, percent, decimals, exponents, scientific notation and square roots)
PO 2: Demonstrate the relationship and equivalency among
A: decimals, fractions and percents (e.g., 1/2 = .5 = 50% with halves, fourths and tenths)
2M-E3: Display and use measures of range and central tendency (i.e., mean, median and mode)
PO 1: Find the mean, median, mode and range of data using concrete and illustrative models

LANGUAGE ARTS

W-E1: Use correct spelling, punctuation, capitalization, grammar and usage, along with varied sentence structure and paragraph organization, to complete effectively a variety of writing tasks

New Mexico Standards

SCIENCE:

Strand II: Content of Science

Standard II (Life Science): Understand the properties, structures, and processes of living things and the interdependence of living things and their environments.

K-4 Benchmark II: Know that living things have similarities and differences and that living things change over time.

Grade 4 Performance Standards

1. Know that in any particular environment some kinds of plants and animals survive well, some survive less well, and others cannot survive at all.
2. Know that a change in physical structure or behavior can improve an organism's chance of survival (e.g., a chameleon changes color, a turtle pulls its head into its shell, a plant grows toward the light).
3. Describe how some living organisms have developed characteristics from generation to generation to improve chances of survival (e.g., spines on cacti, long beaks on hummingbirds, good eyesight on hawks).

MATH

Strand: Number and Operations

Standard: Students will understand numerical concepts and mathematical operations.

K-4 Benchmark: Understand numbers, ways of

ACTIVITY

(Have about one-third of the kids in class – ex. 7 out of a class of 21 – get up from their seats and stand two arm lengths apart from one another. Again, these are the mature, healthy trees. Have several of the remaining kids become young trees and crouch under the healthy, spaced trees. Have one or two kids become logs and lie down in the forest. Have a couple of kids with the bugs stuck to them crowd in. Have two kids put on old man masks and become old trees.)

Tree thinning and prescribed burning are important management tools used by the Forest Service. Thinning and burning help to prevent high-intensity, destructive wildland fires.

Without fires, this is what happens:

(Have the young trees slowly stand up. Have the old ones fall over and become logs. Have the insect trees take a bug off and stick it onto a nearby tree. Have the mature trees say, "Boy is it crowded! I am hungry and thirsty, but all these other trees are using up my water!" After the kids have looked around at themselves and realized how crowded it is, let them sit down.)

LESSON CONTINUED

A. Our forests have become very, very dangerous. Imagine walking through a forest today. What would you see? Dead trees on the ground? Trees that seem sick? Dozens of little trees growing between the larger trees? With all this wood in the forest, what would happen if someone left a campfire unattended and a spark flew from the fire up into the trees? A fire would start, and it wouldn't be a nice, small fire that kills weak trees and leaves the healthy ones standing. It would be a large fire with large, greedy flames that consume many of the trees, whether young or old, sick or healthy. These destructive, dangerous fires are called wildfires. Have you heard about wildfires in Arizona? A wildfire is a bad

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representing numbers, relationships among numbers, and number systems.

Grade 4 Performance Standards

1. Exhibit an understanding of the place-value structure of the base-ten number system by reading, modeling, writing, and interpreting whole numbers up to 100,000; compare and order the numbers:
   - recognize equivalent representations for the same number and generate them by decomposing and combining numbers (e.g., $853 = 8 \times 100 + 5 \times 10 + 3$; $853 = 85 \times 10 + 3$; $853 = 900 - 50 + 3$)
   - identify the numbers less than 0 by extending the number line and using negative numbers through familiar applications (e.g., temperature, money)

2. Identify fractions as parts of unit wholes, as parts of groups, and as locations on number lines:
   - use visual models and other strategies to compare and order commonly used fractions
   - use models to show how whole numbers and decimals (to the hundredths place) relate to simple fractions (e.g., ½, 5/10, 0.5)
   - identify different interpretations of fractions:
     ⊙ division of whole numbers by whole numbers
     ⊙ ratio
     ⊙ equivalence
     ⊙ ordering of fractions
     ⊙ parts of a whole or parts of a set

3. Add and subtract fractions with common and uncommon denominators using a variety of strategies (e.g., manipulatives, numbers, pictures):
   - recognize and generate equivalent decimal forms of commonly used fractions (e.g., halves, quarters, tenths, fifths)
   - identify the numbers less than 0 by extending the number line and using negative numbers through familiar applications (e.g., temperature, money)

4. Recognize classes of numbers (e.g., odd, even, factors, multiples, square numbers) and apply these concepts in problem-solving situations.

Strand: Number and Operations

Standard: Students will understand numerical concepts and mathematical operations.

K-4 Benchmark: Understand the meaning of operations and how they relate to one another.

Grade 4 Performance Standards

1. Demonstrate an understanding of and the ability to use:

fire because it can kill most of the trees in the forest.
B. Our forests are unhealthy. Since there are so many trees, the trees have to compete with one another for water and nutrients. Think about it – if you had a garden, would you plant all the trees close together, or would you space them out? Since the trees are all sharing a limited amount of nutrients and water, many of the trees don't get enough of either. Then, they become weak or even sick.

5. Imagine you are a ranger, and you are taking care of a forest that is full of wood. What would you do to save the forest? Answer: We need to let fires burn through the forest again. But we can't just let all the fires that start in the forest burn. Why? Because there's too much wood in the forest, and the fire could easily turn into a wildfire.

6. So what can you do? We can set fires intentionally on days when we know the fire will stay small. We can set fires in the spring or fall when the air is nice and cool and there isn't too much wind. Why don't we burn on days that are windy? Because the wind will fan the flames and make them bigger. Have you ever blown on hot coals to get them to flame up? Wind does the same thing to a forest fire.

To keep the fires we start small, we also remove some of the trees before we burn. This is called thinning. That way, there won't be too much wood in the forest, and the fire will stay small.

A fire that is set deliberately, or a fire that we allow to burn, is called a prescribed fire. Like a doctor's prescription, prescribed fires help keep the forest healthy. Prescribed fires kill young, weak and sick trees, leaving the other trees more room to grow. Because these fires remove wood from the forest, they also help prevent wildfires. Prescribed fires are done very, very carefully, with a lot of people and a lot of equipment.

7. So, is Smokey Bear wrong? Should we stop being careful with fire because the forest needs to burn? NO! Our forests are more dangerous than they have ever been. On a hot, dry day

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- standard algorithms for the addition and subtraction of multi-digit numbers
- standard algorithms for multiplying a multi-digit number by a two-digit number and for dividing a multi-digit number by a one-digit number

2. Select and use appropriate operations (addition, subtraction, multiplication, and division) to solve problems.
3. Extend the uses of whole numbers to the addition and subtraction of simple decimals (positive numbers to two places).
4. Demonstrate commutative, associative, identity, and zero properties of operations on whole numbers (e.g., 37 x 46 = 46 x 37 and (6 x 2) x 5 = 6 x (2 x 5)).
5. Demonstrate the concept of distributivity of multiplication over addition and subtraction (e.g., 7 x 28 is equivalent to (7 x 20) + (7 x 8) or (7 x 30) - (7 x 2)).

Strand: Data Analysis and Probability
Standard: Students will understand how to formulate questions, analyze data, and determine probabilities.
K-4 Benchmark: Select and use appropriate statistical methods to analyze data.
Grade 4 Performance Standards
1. Compare and describe related data sets.
2. Use the concepts of median, mode, maximum, minimum, and range and draw conclusions about a data set.
3. Use data analysis to make reasonable inferences/predictions and to develop convincing arguments from data described in a variety of formats (e.g., bar graphs, Venn diagrams, charts, tables, line graphs, and pictographs).

LANGUAGE ARTS
Strand: Writing and Speaking for Expression
Content Standard II: Students will communicate effectively through speaking and writing.
K-4 Benchmarks II-B: Apply grammatical and language conventions to communicate.
Grade 4 Performance Standards
1. Use simple and compound sentences in writing and speaking.
2. Combine short, related sentences with appositives, participial phrases, adjectives, adverbs, and prepositional phrases.
3. Identify and use regular and irregular verbs, adverbs, prepositions, and coordinating conjunctions in

Smokey Bear travels all over the country telling people about the importance of being careful with fire. Smokey Bear's message is as important today as it was 60 years ago when he started his career.

it doesn't take much to start a large, devastating, deadly wildfire. Have you heard about people accidentally starting big fires? We have to be careful with fire like never before. Please remember to always be careful with fire in the forest. Leave the prescribed burning to the professionals!

ACTIVITY

I hope you enjoyed that lesson and learned some things too. Now, I'm going to hand out something I want you to read and then there are some math questions on what you read. OOOH! Math questions! I know some of you might be good in math and that's great. But, I've got to admit to you that I had a hard time with math in school. I studied hard, though, and ended up doing pretty well in math. Now I'm glad I did because I can see how important math is in so many ways.

Anyway, I think you will find these questions interesting because they all relate to forests and fire. (Hand out "Fast Forest Facts," "Fast Fire Facts," and "Math in the Forest" student sheets. Let the students have some time to read and work on the problems. Encourage the teacher to go around the room and help the kids. You do the same. After the students have had some time to work on the problems, review the answers to the "Math in the Forest" worksheet with them.) You may want to customize the facts and worksheet for your forest. The following sites have good statistical information:
http://www.fs.fed.us/fire/links/links_firestats.html and
http://www.nifc.gov/stats/

CLOSING:

I hope that you had some fun today and also learned some important things about how fire affects our forest.
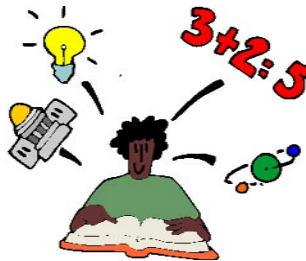
writing and speaking.
4. Use parentheses, commas in direct quotations, and apostrophes in the possessive case of nouns and in contractions.
5. Use underlining, quotation marks, or italics to identify titles of documents.
6. Capitalize names of magazines, newspapers, works of art, musical compositions, organizations, proper nouns, and the first word in quotations when appropriate.
7. Spell correctly roots, inflections, affixes, and syllable constructions.
8. Compose multiple paragraphs with:
   • topic sentences
   • specific, relevant details
   • logical progression and movement of ideas
   • coherence
   • elaboration
   • concluding statement related to topic
9. Speak in a manner that guides the listener to understand important ideas by using proper phrasing, pitch, and modulation.

SOCIAL STUDIES
Strand: Geography
Content Standard II: Students understand how physical, natural, and cultural processes influence where people live, the ways in which people live, and how societies interact with one another and their environments.
K-4 Benchmark II-C: Be familiar with aspects of human behavior and man-made and natural environments in order to recognize their impact on the past and present.
Grade 4 Performance Standards
1. Explain how geographic factors have influenced people, including settlement patterns and population distribution in New Mexico, past and present.
2. Describe how environments, both natural and man-made, have influenced people and events over time, and describe how places change.
3. Understand how visual data (e.g., maps, graphs, diagrams, tables, charts) organizes and presents geographic information.
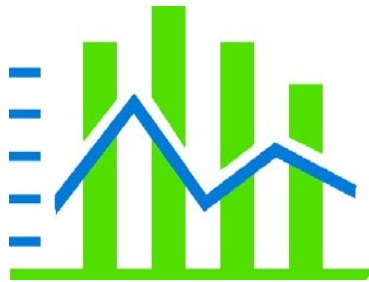
OPTIONAL ASSESSMENT:

Now after everything we've done today, I would like to ask each of you to write a paragraph with three positive and three negative things about fire in the forest. You can turn these into your teacher later so that he/she can check your paragraph for correct grammar, spelling and structure. Right now, though, I'd like you to tell me some ideas about what you might write. So, what are some of your ideas about positive and negative aspects of fire in the forest? (Depending on time, you may want to make your closing remarks and let the kids discuss their paragraphs with the teacher later.)

HANDOUT

Smokey Bear comic books in Spanish and English (one per student); "Children's Fire Safety Activity Book" (one per student).

SUPPLIES

- Tree cookie or drawing of tree cookie
- Plastic bugs to stick on students during activity
- Old man masks (two)
- Flaming staff
- "Fast Forest Facts" sheet (one per student)
- "Fast Fire Facts" sheet (one per student)
- "Math in the Forest" sheet (one per student)
- Smokey Bear comic books in English and Spanish (one per student)
    - Available through National Symbols Catalog.
    - The comic book of the origin of the living symbol of Smokey Bear. This classic story has endeared generations of children to Smokey and his educational fire prevention messages.
- "Children's Fire Safety Activity Book" (one per student)
    - Available through National Symbols Catalog.
    - Activity book on fire safety, fire education, Smokey prevention messages, and wildland/urban interface home tips plus word games, mazes, and assorted coloring sheets.

Program title: What Smokey Bear Never Told You
Target audience: Fourth Grade
Primary topic: Fire is necessary for the forest to be healthy.

Length of program: 1 hour

Setting: indoors

Guidelines addressed are referenced here:

K-4
I. Questioning and Analysis Skills
A1, A2, E4, F1, G1, G3
II. Knowledge of Environmental Processes and Systems
1.
2. A1, C1, C2, C3, D2
3.
4. A2, A3, D2
III. Skills for Understanding and Addressing Environmental Issues
1. A1, A2, A3, A4, B1
2. A4, B1
IV. Personal and Civic Responsibility
C1, D2

Student Page

FAST FOREST FACTS

- According to the U.S. Department of Agriculture, there are 155 national forests covering 192 million acres in the United States. That's about the same size as the state of Texas.

- There are six national forests located in Arizona. The largest one is the Tonto National Forest, which is 2,873,300 acres. The smallest is the Prescott National Forest, which is 1,237,061 acres.

- There are five national forests located in New Mexico. The largest one is the Gila National Forest, which is 3,321,101 acres. The smallest is the Lincoln National Forest, which is 1,103,466 acres.

- The pine bark beetle is a tiny insect that is found naturally in our forests. Because of the conditions mentioned in the lesson (overly thick forest and drought), this insect's population exploded in the summers of 2002 and 2003 and killed hundreds of thousands of trees. Many of the dead, red-needled trees that you can see on the mountains were killed by bark beetles.

- Many areas of our ponderosa pine forest in Arizona/New Mexico have too many trees growing too closely together. When this happens, the trees are weakened and become much more susceptible to wildfire, disease and insects.

- The highest point on the Kaibab National Forest is around 10,000 feet and the lowest point is around 3,000 feet.

- America's largest national forest is the Tongass National Forest in Alaska, which covers more than 17 million acres.

- Our national forests provide habitat for all kinds of wildlife, especially large animals like elk and Rocky Mountain bighorn sheep.

Student Page

FAST FIRE FACTS

- In 2002, the Rodeo-Chediski Fire burned 470,000 acres on the Apache-Sitgreaves National Forests and the White Mountain Apache Reservation, making it the largest fire in Arizona's history. Both fires were started by people.

- Approximately two-thirds of wildfires in the United States are set accidentally by people.

- Some fires in the forest are set on purpose by the Forest Service to burn up some of the smaller trees and debris on the forest floor like pine needles. This helps the trees that are left to grow strong and healthy. These are called "controlled" or "prescribed" fires and are lit only when the winds are not too strong and there is enough moisture so the fires don't burn too hot.

- In 2002, the Kaibab National Forest had 146 fires. Of those fires, 111 were caused by lightning and 36 were human-caused. The forest was closed for several weeks during the summer to help prevent person-caused fires. In 2000, the forest was also closed for awhile during the summer. Out of 248 total wildfires that year, only 19 were caused by people. The rest were started by lightning.

Student Page
MATH IN THE FOREST

Use the facts given to you to answer the following questions.

1. What would the average elevation be for the Kaibab National Forest?
    a. 5,500 feet
    b. 6,500 feet
    c. 7,500 feet
    d. 8,500 feet
2. About what percentage of wildfires in the United States are set accidentally by people each year?
    a. About 33%
    b. About 50%
    c. About 67%
    d. About 88%
3. About how many Prescott National Forests would fit in the Tongass National Forest?
    a. About 10
    b. About 14
    c. About 20
    d. About 24
4. Approximately what percentage of all national forests in the United States are found in Arizona?
    a. 1%
    b. 4%
    c. 7%
    d. 10%
5. The Rodeo-Chediski Fire burned nearly _____ acres?
    a. ¼ million acres
    b. ½ million acres
    c. ¾ million acres
    d. 1 million acres
6. In the year 2000, how many lightning fires were there on the Kaibab National Forest?
    a. 210
    b. 219
    c. 229
    d. 238